

# Approaches to the vaccination of pregnant women

## Experience from Stockport, UK, with prenatal influenza

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For the 2010/11 influenza season the prenatal vaccination program was extended to all women in England and Wales irrespective of gestational age—this was a considerable shift in practice for both pregnant women and healthcare providers where the emphasis previously had been only on targeted vaccination for pregnant women with adverse risk factors for influenza infection. This paper will describe the program's operation in Stockport, UK during this season when uptake was among the highest in the England and Wales.

Stockport is situated in the south east of Greater Manchester. It is a generally affluent area with a population of 295 000. Health indicators are generally higher than the regional average. The target population for influenza is just under 50 000 residents (excluding pregnant women).

### Midwifery Services

Provision of antenatal care in Stockport has used a midwife-led model for many years and this group of staff are thus a key element in accessing pregnant women and their partners.<sup>1</sup> Each year just over 3,500 births occur to Stockport residents. Antenatal care is delivered in the community at several visits during the gestational period—for approximately 50% of women this is provided in the GP practice where there is ready access both to cold chain maintained influenza vaccines and computerized clinical systems. Detailed discussions with senior midwife managers led to their agreement and strong support for midwives to deliver vaccines in these “on site” clinics; where antenatal clinics were delivered in other venues, midwives signposted pregnant women to the appropriate GP practice for administration of influenza vaccine.

### Prenatal Influenza Infection

Influenza infection may affect the mother, fetus and the newborn infant. Maternal infection can cause serious respiratory complications and death. This was well documented in the recent H1N1 swine influenza pandemic, but has also been reported with

seasonal influenza infection. On the developing fetus, adverse outcomes include stillbirth and impaired intrauterine growth, which of itself has long-term consequences for the child, including reductions in adult height, IQ at 18 y and academic performance. Some authors have also reported an increase in prematurity rates, although other workers have not made the same observation. Influenza disease which reportedly affects between 2 and 10% of people annually, is also more common in those under 5 y with the highest death rate being seen in those aged < 2 mo.

### Rationale for Pre-Natal Immunization

The new born infant encounters a relatively hostile microbiological environment with protection provided by external barriers, together with innate and adaptive immune systems—none are fully mature (and hence protective at birth) and additional defenses are provided by passively transferred, maternally derived antibodies. Vaccinating a woman in pregnancy generates neutralizing antibodies which protect the mother and by crossing the placenta provide protection to the fetus/ newborn infant—the latter for several months after birth until host defense barriers have matured and primary immunization programs are effective. IgA antibodies in breast milk may also be a source of protection to breast fed infants.

Influenza vaccination in the UK prior to pandemic influenza in 2008/9 was recommended and freely provided for those aged 65 y and over, those aged 6 mo to 64 y with an at risk underlying health condition(s), people in long-stay institutions and health care workers.

### Prenatal Influenza Vaccine Program

For pregnant women, the recommendation in 1998 was that “there is no evidence that influenza vaccine prepared from inactivated virus causes damage to the fetus. However, it should not be given during pregnancy unless there is a specific indication.”<sup>2</sup> Thus, pregnant women were eligible if they were in an at risk group but there was no real national initiative recommending “pregnant

women with a specified risk factor be given influenza vaccine.” In 2009 the swine influenza pandemic started and following early findings of adverse outcomes in pregnant women, influenza vaccination was recommended initially for all women in the 2nd and 3rd trimesters. However in 2010, given the increasing evidence of maternal disease impact and the very early occurrence of disease in new born infants for whom there was no licensed vaccine, prenatal immunization was recommended for all pregnant women irrespective of duration of pregnancy.

Immunization services are provided either by general practitioners or community based nursing staff—for the prenatal vaccine program, midwives also provided services on a community, outpatient and inpatient basis.

### Uptake data

Uptake data for Stockport compared with the Regional and National averages are shown in Table 1. These data were obtained from IMMFORM, a Department of Health system which remotely accesses GP clinical systems and records the numbers immunized using READ codes to identify those in recommended groups who have been vaccinated.<sup>3</sup> (Table 1)

There are four observations of note. First, Stockport rates for both at risk and not at risk are significantly higher than comparable regional or national data. Second, Stockport rates increased over the two seasons for which data are shown. Third, Stockport rates for both at risk and not at risk increased over the two seasons in contrast to regional and national data. Finally, uptake was higher in at risk pregnant women compared with not at risk nationally, regionally and in Stockport.

### Program Evaluation

There was no formal audit of the prenatal influenza vaccine program but the views and experiences of various workers (GPs, midwives, practice nurses, practice managers, receptionists, district nurses, program managers) and pregnant women were sought both by asking them to write to the author in his capacity as District Immunisation Co-ordinator with comments, and during face to face debrief sessions after the program had finished. These various inputs provided the basis for an end of influenza season report.

### Program Components

The following are elements of the program, which the audit suggested were important in achieving the high uptake rates reported. They are presented alphabetically and not by order of importance.

**Community awareness campaign.** To complement the national program, a local influenza awareness campaign was organized by the three statutory organisations responsible for disease control in Stockport—the Primary Care Trust (PCT), The NHS Foundation Trust and the Metropolitan Borough Council. Meetings pre-program ensured that they had a jointly agreed and managed campaign with the following components:

- **Media**—each week had a different influenza theme with real life case histories to make the story more locally relevant. Ten media releases were made during the campaign, and there were 15 newspaper articles and nine radio interviews during this 18 week campaign. Addressing myths and misconceptions was a key aspect of the program, as were pregnant women.
- **Issuing campaign materials**—leaflets, posters and banners were distributed to local libraries, children’s centers, the maternity unit, pharmacies, and community centers. All pharmacies used large stickers advertising the influenza campaign for sealing pharmacy bags.
- **Online, digital and social media**—Twitter was used regularly with messages about influenza @NHSSStockport.
- **GP communications**—a weekly influenza newsletter for GP practices was started at the beginning of October. This provided information about best performers of the week, some examples of good practice, tips from practices about what worked for them and a list of all the local publicity that week.
- **Targeted work**—where uptake in at risk groups was known to be low in the previous season, appropriate contact was made with involved groups/ individuals to offer support as required.

**Community pharmacy program.** Community pharmacists provided a source of advice about the vaccine and the nature of the program—they also immunized just over 1,700 of the “worried well.”

**GP incentive scheme.** The PCT negotiated a Local Enhanced Service which incentivized GPs if they achieved pre-set uptake rates. Thus, rates were set for 65 y and above (80%), 6 mo to 64 y at risk (75%) and pregnant women (75%)—practices had to reach all three targets to qualify for the additional payment.

### Health Worker Impact

Although impossible to quantify, the enthusiasm and confidence that key perceived workers (for the prenatal influenza program—midwives, GPs and practice nurses) brought to the program was thought to be a hugely important aspect of the program. This accords with other research, which has shown the importance of key workers in vaccination. Leadership by senior midwife managers was also crucial.

### IT Input

Prenatal influenza vaccination requires identification of pregnant women. However, while antenatal care is a midwife led-service in Stockport, only about 50% of women actually receive care at the GP center—the remainder are advised by off site midwives to go to the GP practice for immunization—this proved problematic because inconsistencies in advising about their pregnant patients meant that some GPs weren’t always able to follow up non attenders.

Furthermore, occasional incorrect coding, failure to ensure all vaccines administered had been entered on the practice clinical support system, and not checking the IMMFORM return meant that the PCT Data Quality Team had to spend a considerable

**Table 1.** Influenza prenatal vaccine uptake rates<sup>3</sup>

Vaccine	Year	Risk category*	Uptake Rates (%)			Position in country
			England	North West SHA	Stockport	
Influenza	2010/11	At risk	56.6%	60.1%	65.1%	18th
		Not at risk	36.6%	41.8%	53.0%	2nd
	2011/12	At risk	50.8%	56.3%	79.7%	1st
		Not at risk	25.5%	31.8%	63.4%	1st

\*At risk means there is an associated underlying medical condition that would have made the pregnant woman eligible for influenza vaccine irrespective of pregnancy status.

time with individual practices to ensure accurate data returns. The need for regular training around the different clinical support systems had been recognized and provided during earlier influenza vaccine campaigns.

Uptake data were made available to all practices on their weekly influenza vaccine performance by at risk groups, including pregnant women—this was presented as a “league table” with comparison to last season’s performance at the same point in time. It enabled individual practices to monitor their performance and compare it with the previous year and their colleagues - the same data were sent to senior midwifery managers. All vaccine uptake data were also discussed at the weekly influenza strategy telephone conference. The real time monitoring of the program meant that it was possible to assist local services/ practices if and when problems were identified.

**Medical education.** Educational sessions for GPs and all other community staff (including receptionists who are often the first point of contact with primary care) involved in the program were offered from July 2011 onwards—these were supported by a locally produced webcast. The key issues addressed in all education media were—what is the impact of influenza disease on mother and baby; what are the characteristics of influenza vaccine (including vaccine protective efficacy), what are the vaccine side effects and contraindications, and are there any alternative methods of protection. Education sessions for midwives addressed the same areas but more time was devoted to the issues of efficacy and safety (mother and child) with role-play to consider how best to communicate these data to pregnant women.

**Strategic influenza group teleconferencing**

A weekly telephone conference held from October 2011 to March 2012 kept senior staff in the different organizations (NHS FT, MBC and PCT, and the out of hours primary care provider) aware of how the influenza epidemic was progressing and this included a review of the current status of the vaccine program, including the prenatal component.

**Discussion**

Vaccination of pregnant women should be considered when the likelihood of acquiring disease is high, the subsequent disease risk in the mother or newborn infant is high, and there is an

available safe and effective vaccine. Influenza disease meets these criteria hence the inclusion of prenatal influenza first as a targeted program then universally.

Experience from selected other countries offering prenatal influenza vaccine during both pandemic and seasonal influenza was reportedly 29.3% (France), 40% (Australia), and 52% (USA).<sup>4-8</sup> However, uptake rates in Stockport, Greater Manchester were significantly higher than the national average and the purpose of this paper was to explore how this might have been achieved with the expectation that such information might inform other providers of prenatal influenza immunization—the observations may also be applicable to the temporary prenatal pertussis program and emerging vaccines that will be targeted at pregnant women including Group B Hemolytic Streptococcal vaccine.

In Stockport the individuals and organizations involved—the GPs, NHS FT, PCT, MBC, out of hours provider and the District Immunisation Coordinator (DIC)—have worked together for many years on a number of public health programs including vaccination: involvement with midwives on influenza started more than ten years ago. This history of collaborative working has been very positive and engendered a high degree of trust, which we were able to further develop when prenatal influenza vaccination was introduced.

Given the midwife-led model of antenatal care in Stockport, it was essential that this group of staff were convinced about the need for prenatal influenza and confident about vaccine safety and efficacy and that there were valid data to support the vaccine program, because they were usually the initial point of contact with health services by pregnant women. However, because nearly half of all pregnant women would have to be immunized by GPs when antenatal clinics were offsite, it was essential that the same information be made available to all primary care staff. These requirements had considerable resource implications for the training function of DIC and his staff.

The prenatal influenza vaccination program was dependent on an effective IT system both for identifying at risk individuals and recording vaccines administered. This proved an area where some practices needed support particularly around patient misclassification and vaccine administration miscoding—this problem was compounded by practices using more than five different clinical support systems in Stockport.

The role of the GP incentive scheme was important—the prenatal program was heavily dependent on their involvement and support and required a considerable amount of resource input – hence the negotiation of the scheme by the PCT.

#### Disclosure of Potential Conflicts of Interest

No potential conflicts of interest were disclosed.

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